
Visible and near -IR integral field spectrograph

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- *Science specifications*
- *Baseline design*
- *R&D activities*
- *Development plan*

Science Specifications

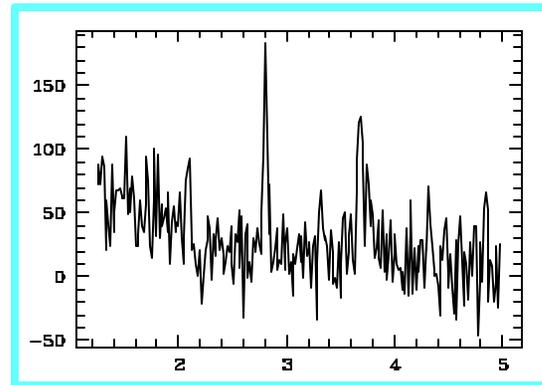
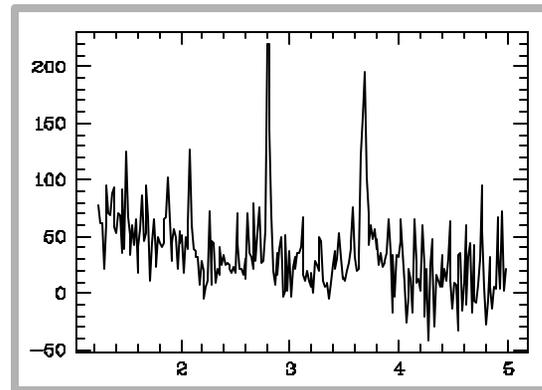
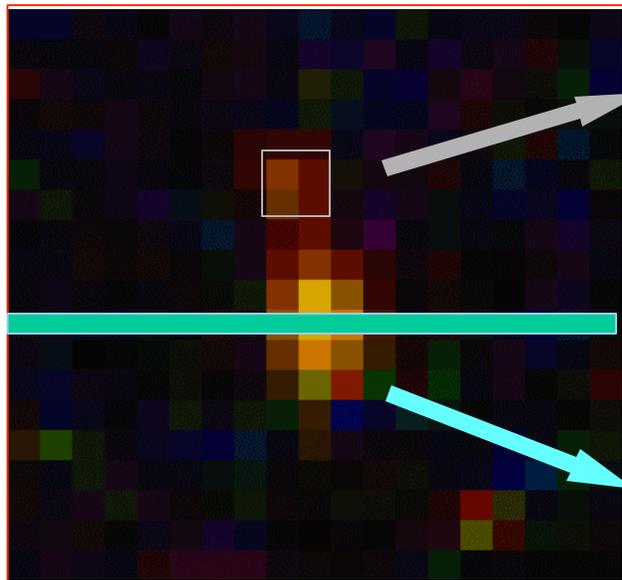


- One of 3 instruments on-board SNAP
 - Confirm SNe event / type
 - Measure redshift of parent galaxy
 -
- Efficiency is a prime specification
- Wavelength coverage 0.35-1.7 microns
- Field / sampling: 2'' / 0.1''
- Spectral resolution: ~200

Integral Field Spectroscopy



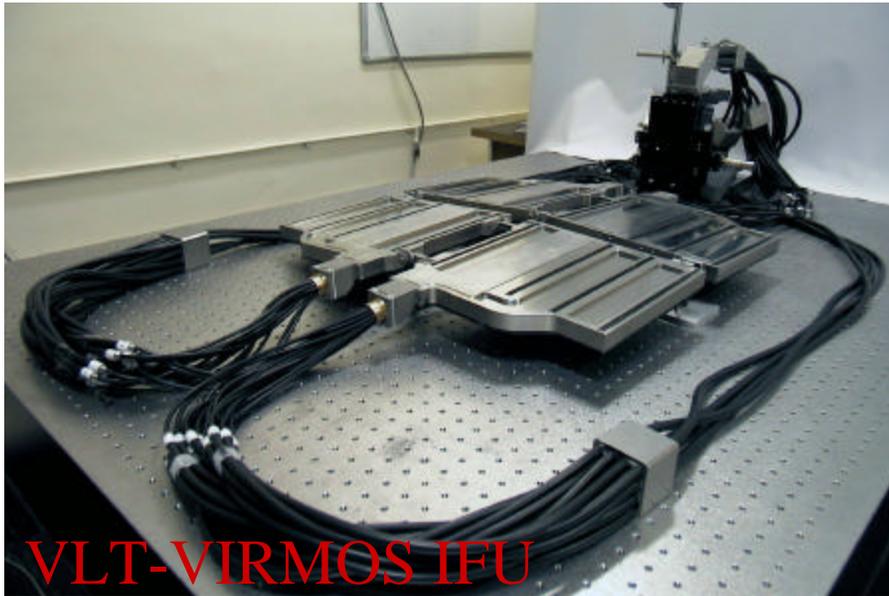
- Get SNe spectrum and galaxy redshift at once
- Point and shoot, easier operationally than long slit spectrograph
- No slit losses



- **Integral field spectrograph concept**
 - *2x2 arcsec² FOV*
 - *Very efficient*
 - *Spectroscopy of ALL spatial resolution elements at once*
 - *No slit losses*
 - *Operationally less demanding on spacecraft than long slit*

- **Capitalize on development for ground based 8m and NGST**
 - *ESA NGST/IFMOS study*
 - *ESO VIRMOS instruments (VIMOS, NIRMOS)*

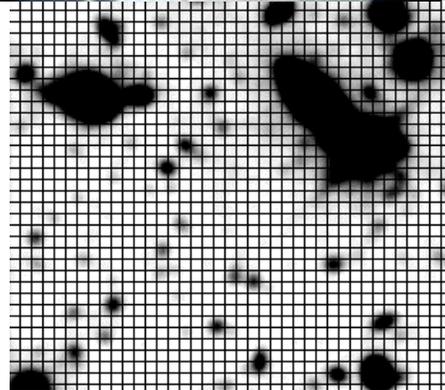
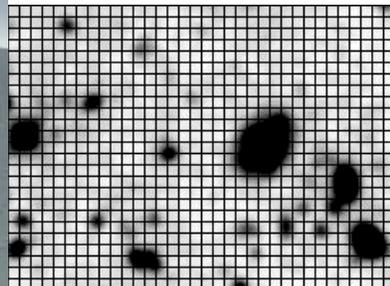
Build on experience



VLT-VIRMOS IFU

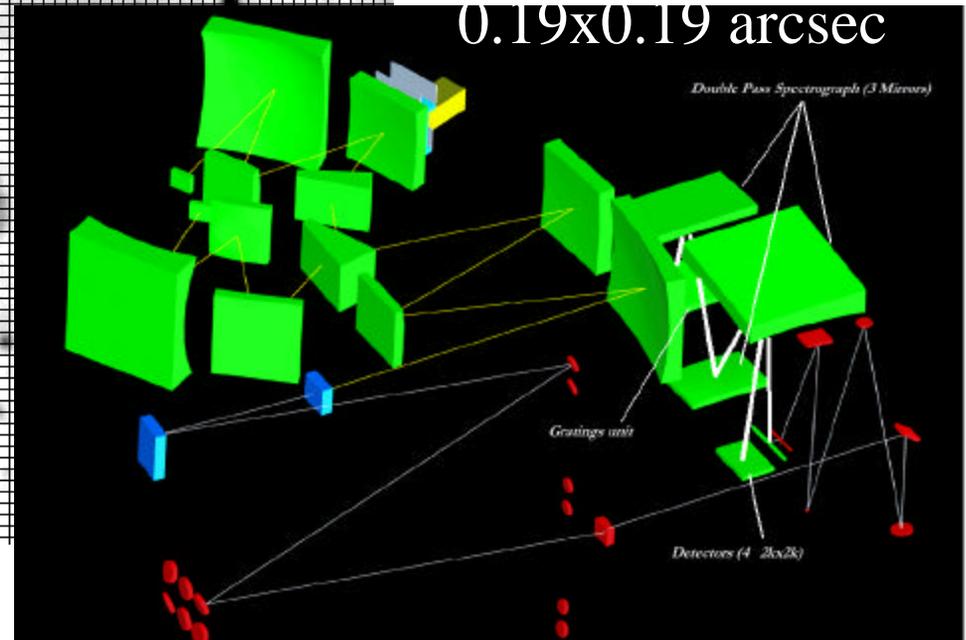
1x1 arcmin²
0.6 arcsec/fiber
6400 fibers

Sampling 1x1 arcmin²

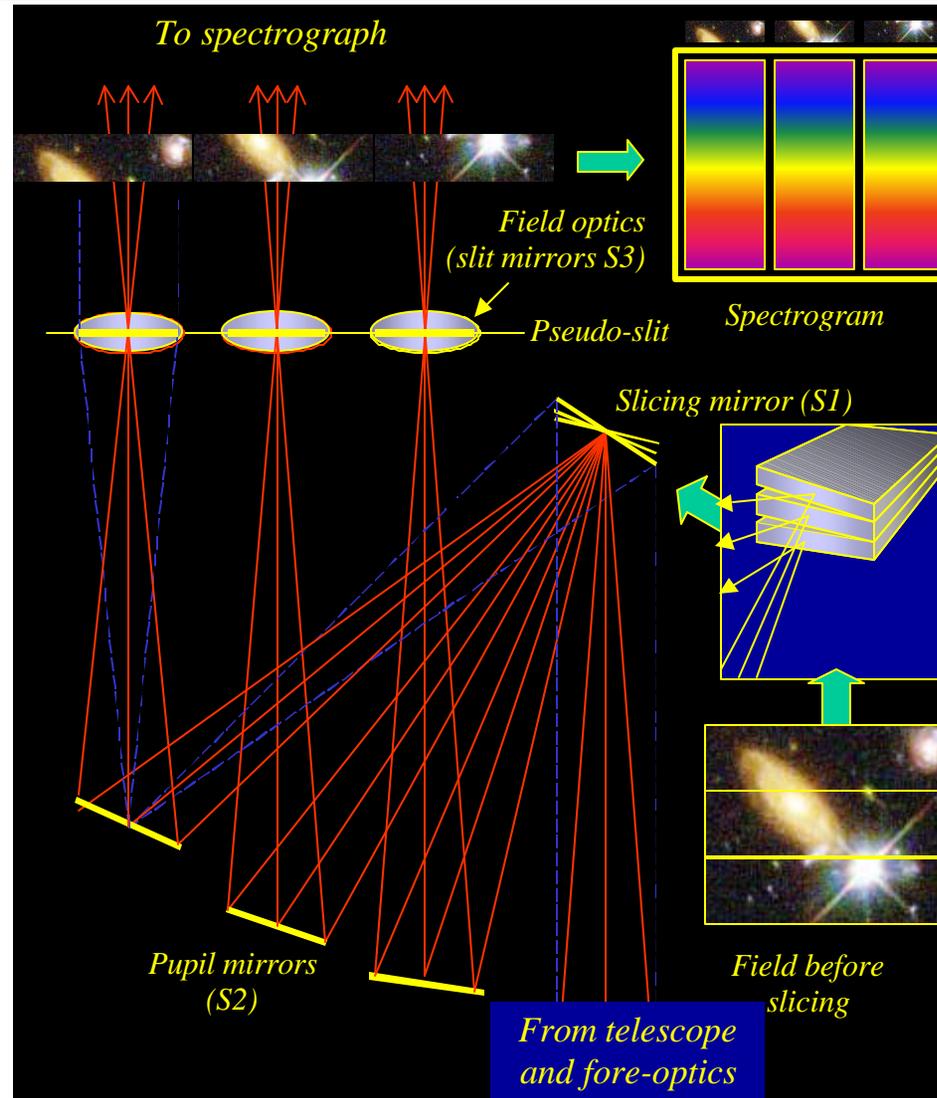


ESA NGST-IFMOS
study
46x40 arcsec²

0.19x0.19 arcsec



Baseline Design *image slicer principle*



Baseline Design



2 integral field spectrographs:

- *one for 0.35-1 microns domain*
- *one for 0.6-1.7 microns*

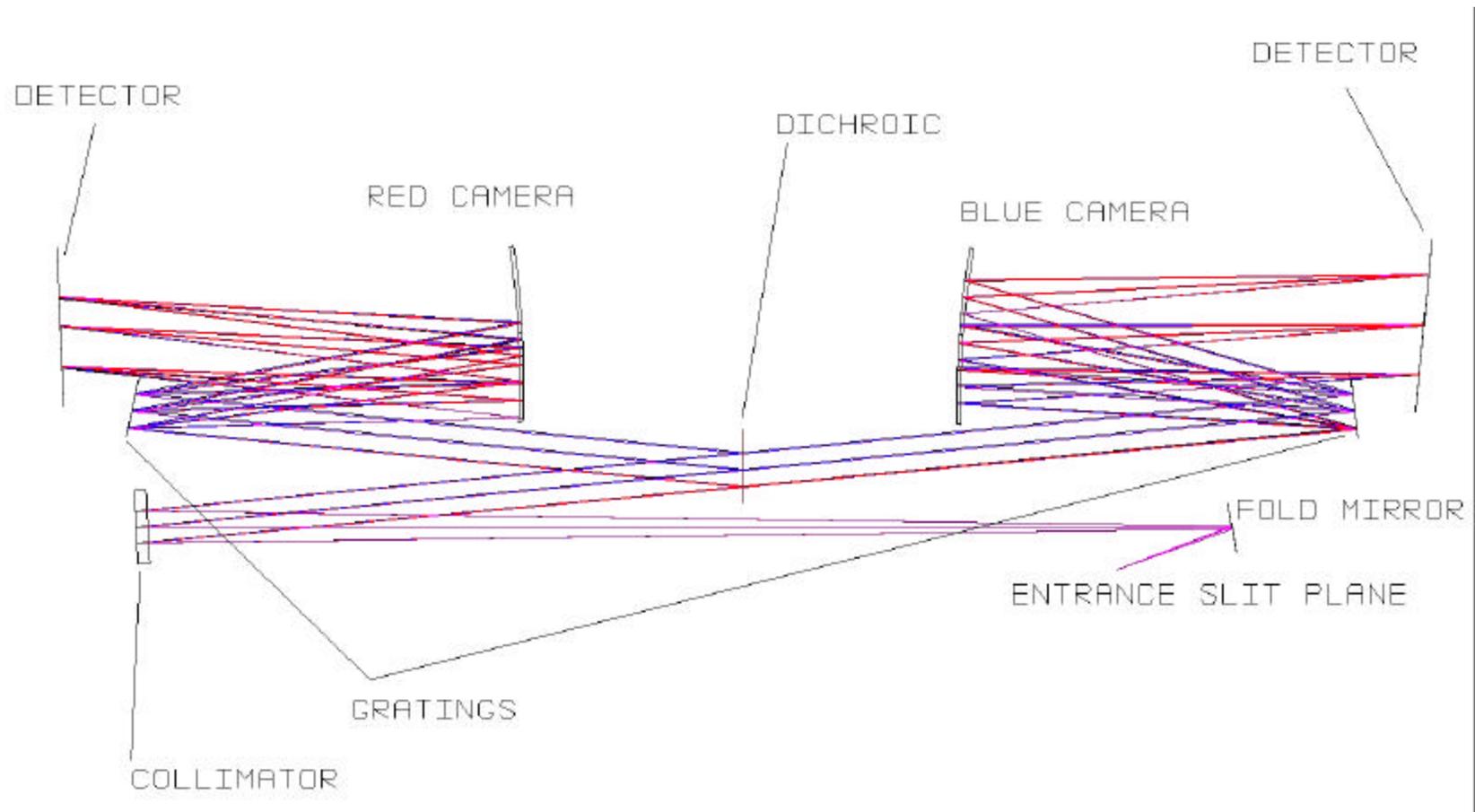
Table 1: spectrograph main characteristics

Item	Visible	IR	Spec
Wavelength coverage μm	0.35-1	0.6-1.7	0.35-1.7
Field of view	2.03" x 2.03"	2.03" x 2.03"	2" x 2"
Spatial resolution element	0.07	0.12	0.07-0.12
Number of slices	29	17	-
Spectral resolution, A	15/30	30/50	15-30-50
Throughput w/o slicer	75%	75%	As high as possible
Throughput w/ slicer	65-71%	65-71%	As high as possible

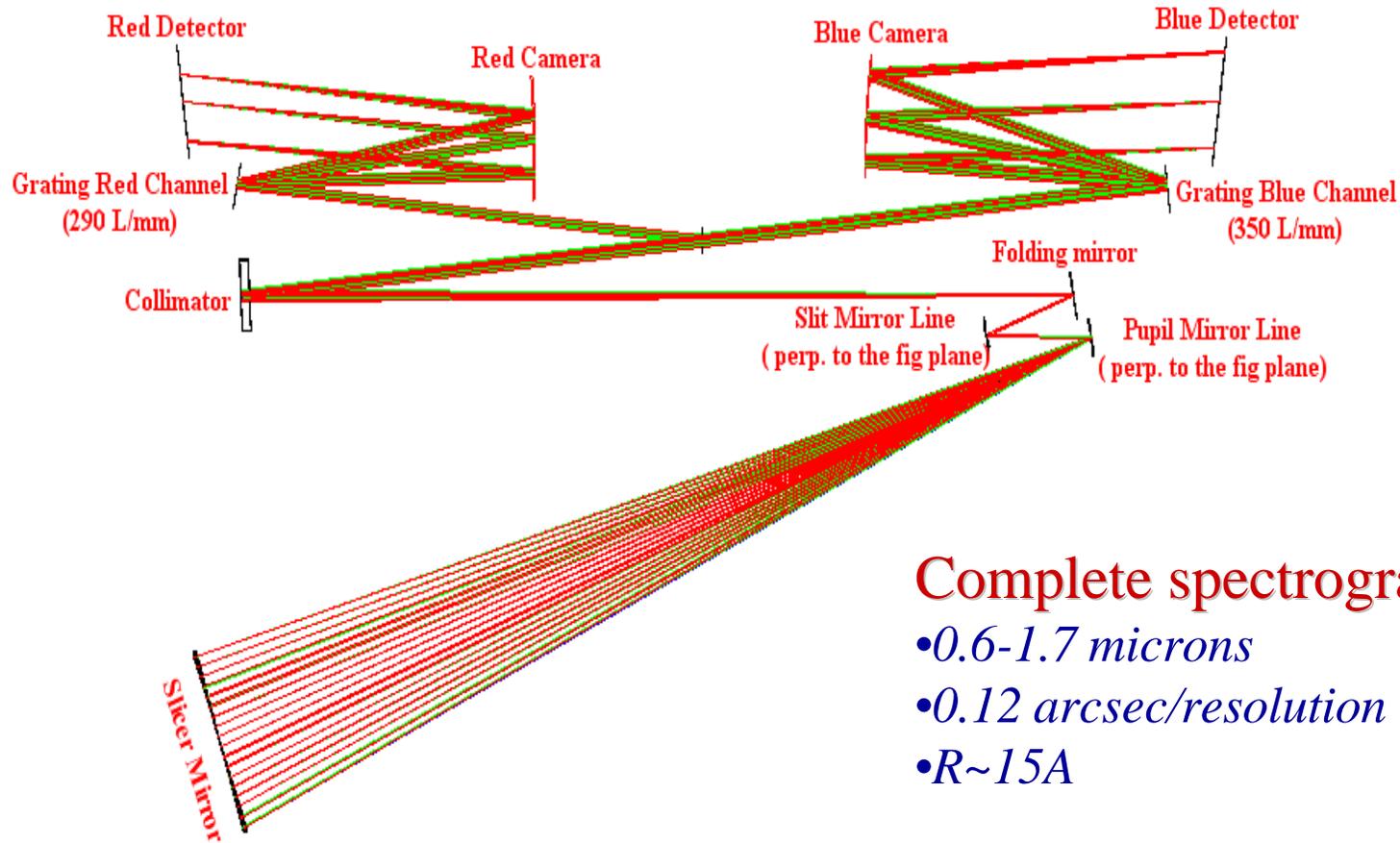
Spectrograph design



Near-IR spectrograph



Spectrograph design



Complete spectrograph:

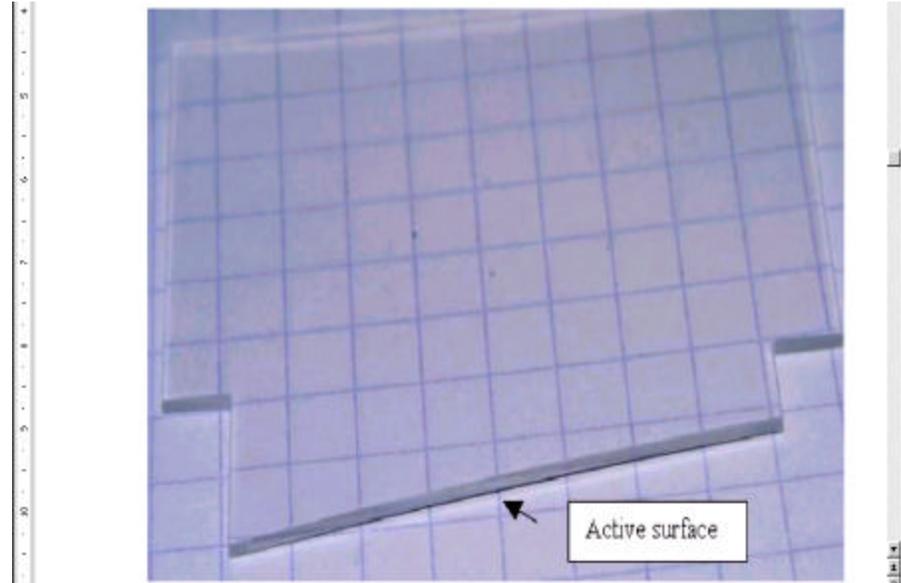
- $0.6-1.7$ microns
- 0.12 arcsec/resolution element
- $R \sim 15A$

R&D: image slicer



- **Prototype**

- *individual slices have been produced*
- *need to manufacture a stack of 15 slices*



- **Space qualify the device**

- *Evaluated to be at Technology Readiness Level 5 by a NASA-NGST panel (need TRL6 to fly)*
- *Cryogenic tests: optical and mechanical*
- *Launch load tests*

R&D: performances



- Detectors performances
- Operating temperature (thermal background in IR)
- Accurate spectrophotometry at 1% level

➔ Produce Exposure Time Calculator

➔ Recommendation on detectors specifications and operating temperature